

OBJECTIVE 20: MEDICAL SERVICES - TRANSPORTATION

OBJECTIVE

Demonstrate the adequacy of vehicles, equipment, procedures, and personnel for transporting contaminated, injured, or exposed individuals.

INTENT

This objective is derived from NUREG-0654 which provides that OROs should have the capability to transport contaminated, injured, or exposed individuals to medical facilities. It entails the provision of both transportation and determination of the medical facility to which contaminated, injured, or exposed individuals should be taken. (Treatment of contaminated, injured, or exposed individuals in medical facilities is addressed in Objective 21, Medical Services - Facilities.) (See evaluation criterion from Planning Standards F., H., J., L., and N.)

Capabilities and procedures relevant to this objective are contained in FEMA Guidance Memorandum (GM) MS-1, Medical Services. Provisions of MS-1 apply to contaminated, injured, or exposed individuals, including those who are: contaminated; contaminated and otherwise physically injured; or exposed to high levels of radiation.

Demonstration of this objective focuses on:

- o control of the spread of contamination from individuals who may be contaminated and injured
- o setting of priorities between the need to address radioactive contamination and need for prompt transportation to a medical facility for an individual with an urgent medical condition
- o transportation of such individuals to medical facilities equipped to deal with such problems
- o communications with the medical facility by the vehicle crew while en route to the medical facility
- o monitoring and decisions on the need to decontaminate emergency vehicles after use
- o completion of activities through adherence to the plan

The demonstration of this objective focuses on contamination control measures for

transported individuals, not medical protocols per se. The exception to this intent pertains to modification of contamination control procedures and decisions on transportation to a medical facility in the event that the individual has an urgent medical condition.

While OROs may utilize licensee personnel for radiological monitoring and contamination control functions involved in the transportation of contaminated, injured, or exposed individuals, such arrangements should be documented in ORO plans and supported by written agreements.

DEMONSTRATION CRITERIA

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CRITERION

- L.4.** **1. Nature and extent of external radiological contamination of an individual is determined.**

Explanation

Monitoring may be performed by a health physics technician or by a member of the vehicle crew as provided for in the plan. The responsible monitoring staff should demonstrate the capability to monitor individuals for external contamination in the field prior to transport to the medical facility, or immediately upon arrival at the medical facility. If monitoring of an individual is deferred to a medical facility, the vehicle crew should assume that the individual is contaminated and use appropriate contamination control procedures. Staff responsible for monitoring, as stated in the ORO's plan, should demonstrate the proper use of equipment for radiological monitoring and are capable of monitoring in accordance with the plans.

The monitoring technician should demonstrate the proper use of an operable survey instrument(s). The instrument(s) should be labeled on the exterior regarding instrument responsiveness to an identified check-source.

Instruments used for detecting contamination during the emergency phase do not require recalibration; however, they should be accompanied by a radioactive check-source that can be used in the field as a single point calibration check. The instrument(s) used for monitoring should be portable with a single probe containing a Geiger-Mueller type radiation detector that provides for the detection of beta plus gamma radiation and gamma radiation only (e.g., a CD V-700). The minimum detectable level should not be greater than 300 counts per minute (cpm) for beta plus gamma radiation. (This is currently being reevaluated.)

The instrument(s) should be equipped with earphones or a speaker so that the technician

can watch the probe while monitoring without being distracted to read the meter indicator. The probe should be covered with thin plastic and the beta shield should be open. The purpose of the plastic cover is to easily remove any contamination that might get on the probe. A plastic thickness of one to two mils (e.g., a sandwich bag) will be thin enough to avoid any significant reduction in response from the beta radiation. Transparent plastic may be helpful to permit a visual determination of whether the beta shield on the probe is opened or closed; however, this is not required.

Prior to using an instrument(s) for monitoring, the monitoring technician should demonstrate the process of checking the instrument(s) for proper operation. This involves checking the battery status, measuring the radiation from the accompanying check-source, and comparing the result to the proper reading stated on the label. Once the operability of the survey instrument is confirmed, background radiation levels should be determined in the immediate vicinity where individuals will be monitored. An instrument that does not respond properly to these parameters should not be used.

If monitoring of the individual is accomplished prior to transport to the medical facility, the monitoring technician should demonstrate the capability to follow procedures to ensure that monitoring is accomplished in a low-radiation background area [i.e. less than 0.1 milliroentgens per hour (mR/h)]. The crew should demonstrate the capability to determine if the victim should be moved to a low-radiation background area for monitoring.

If the simulated individual has an urgent medical condition, radiological monitoring and contamination control measures should not be undertaken if it would delay addressing the individual's medical conditions.

Extent of Play

Under this criterion, all activities should be completed as in an actual emergency.

The individual's injuries may be indicated on an attached tag or controller inject. Contamination of the individual or the individual's clothing should not be simulated through the use of lantern mantles or other low-level radiation sources such as a radium dial watch.

Evaluation of decision making regarding the setting of priorities between the need for prompt medical treatment and radiological functions should be demonstrated through an evaluator's interview with transportation personnel.

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CRITERION

L.4. 2. Emergency medical personnel who are responsible for transporting individuals from the accident site use appropriate contamination control measures.

Explanation

The vehicle crew should demonstrate the capability to follow contamination control procedures during transport of contaminated injured individuals. Example methods for contamination control are:

- o use of gloves as protection against spreading contamination
- o lining of the patient area of the vehicle with a protective covering or wrapping the individual in a sheet or blanket
- o covering of the survey instrument probe with plastic to minimize possible contamination

The use of gloves will protect the hands from contamination, and removal of the gloves after handling the contaminated individual will prevent the spread of contamination. Lining of the patient area of the vehicle or wrapping the patient with a sheet or blanket will help prevent contamination of the vehicle and the medical facility, thereby reducing the effort required for decontamination prior to returning these facilities to normal use. However, these actions will not provide protection of the patient or the attendants from radiation. Therefore, contamination control efforts should not be carried out if they would delay urgent medical care for the patient. Likewise, contamination on the patient should not be of significant concern with regard to exposure of the vehicle crew to radiation; therefore, urgent medical care for the victim should not be delayed in order to provide special radiation protection for the vehicle crew.

Extent of Play

Medical personnel should demonstrate all contamination control measures as they would in an actual emergency.

The individual's injuries and degree of contamination should be indicated on an attached tag or simulated by controller inject.

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CRITERION

- L.4. 3. The appropriate official makes a determination on the identity of the medical facility to which the individual will be taken and the individual is transported without undue delay.**

Explanation

Responsible OROs should demonstrate the capability to make determinations on the identity of an appropriate medical facility to which an individual is transported. Personnel responsible for determining the medical facility to which contaminated, injured, or exposed individuals will be taken should know the names and locations of medical facilities whose OROs have agreements for care of such individuals. OROs should demonstrate the capability to decide to which medical facility individuals should be taken, giving consideration to contamination and injury problems in the exercise. The vehicle crew should demonstrate the capability to drive the individual to the selected medical facility without undue delay.

Extent of Play

Under this criterion, transport of the simulated contaminated, injured, or exposed individual to a medical facility should be performed as it would be in an actual emergency. However, the use of flashing lights and sirens are not necessary during the exercise play. The capability to make decisions to forego radiological monitoring and contamination control measures and to select the closest medical facility for a contaminated, injured, individual with an urgent medical condition should be evaluated through interviews.

Transport service(s) involved in the exercise may be designated before the exercise. If the service demonstrating medical transport capabilities has both onsite and offsite responsibilities, demonstration of this objective should be accomplished by transport of either an offsite or onsite individual. Non-specialized vehicles (e.g., cars) may be used to transport individuals instead of ambulances. If OROs decide to use ambulances, and they are needed for response to actual emergencies, non-specialized vehicles may be substituted to complete the transportation phase of the medical services demonstration.

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CRITERION

L.4

4. Communications are maintained with the receiving medical facility.

Explanation

Vehicle crews should demonstrate the capability to maintain communications with the receiving medical facility so that advance preparations essential for receipt of a contaminated injured individual can be initiated (See Objective 21, Medical Services - Facilities). Vehicle crews should demonstrate the capability to communicate with the medical facility information and data on the individual's physical condition, vital signs, radiation monitoring results data, and estimated time of arrival.

Extent of Play

Under this criterion, all activities should be completed as they would be in an actual emergency. Data for communication by the crew should be provided by controller injects.

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CRITERION

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5. The vehicle and its occupants are monitored to detect the nature and extent of radiological contamination and decontaminated, if necessary.

Explanation

The monitoring technician should demonstrate the capability to monitor the vehicle crew and the vehicle and decide on the need for decontamination after contaminated, injured, or exposed individuals have been delivered to the receiving medical facility. Responsible OROs should demonstrate procedures to ensure that neither the vehicle nor any member of the vehicle crew is allowed to return to regular service without contamination evaluation and decontamination, as necessary.

ORO's should demonstrate the use of a Geiger-Mueller type gamma survey instrument described under Demonstration Criterion 1 for monitoring the vehicle and the vehicle crew.

The monitoring technician(s) should demonstrate the capability to use action levels for detecting radiological contamination and for determining the need for decontamination of vehicles. They should demonstrate the capability to determine the need to refer contaminated vehicle crew members and a contaminated vehicle(s) to the monitoring and decontamination center described in Objective 22, Emergency Workers, Equipment and Vehicles-Monitoring and Decontamination.

Prior to using an instrument(s) for monitoring, the monitoring technician should demonstrate the process of checking the instrument(s) for proper operation. This involves checking the battery status, measuring the radiation from the accompanying check-source, and comparing the result to the proper reading stated on the label. Once the operability of the survey instrument is confirmed, background radiation levels should be determined in the immediate vicinity where individuals will be monitored. An instrument that does not respond properly to these parameters should not be used. For vehicles and equipment, the recommendations are not less than 300 cpm using a CD V-700 survey instrument with the beta shield open or equivalent. After decontamination, the recommendations are five mR/h on a CD V-700 for fixed contamination with the measurements being made with the beta shield closed. (These levels are currently being reevaluated.)

The monitors should demonstrate the use of procedures that provide for the release of decontaminated vehicles for continued use.

Extent of Play

Under this criterion, all activities should be completed as they would be in an actual emergency, except that it is not necessary to demonstrate decontamination of the vehicle crew and the vehicle. Decisions on where to send a vehicle and crew for decontamination may be evaluated by the interview process.

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CRITERION

- N.1.a.** **6. All activities described in the demonstration criteria for this objective are carried out in accordance with the plan, unless deviations are provided for in the extent-of-play agreement.**

Explanation

Responsible OROs should demonstrate the capability to follow policies, implement procedures, and utilize equipment and facilities contained in their plans and procedures. OROs should demonstrate that they can follow sequences outlined in the various procedures and perform specified activities, as necessary.

Extent of Play

Under this criterion, all activities should be carried out as specified in the plan, unless deviation from the plan is provided for in the extent-of-play agreement.

CLARIFICATION OF TERMS

The following definitions describe the limited meaning of terms in the context of the Exercise Evaluation Methodology and may vary from the full technical definition for all circumstances.

Action levels refers to thresholds for contamination levels that trigger the need for decontamination established in the plans.

Contaminated, injured, or exposed individuals refers to individuals who are: contaminated, contaminated and otherwise physically injured, or exposed to high levels of radiation.

Controller inject refers to the introduction of events, data, and information into exercises to drive the demonstration of objectives.

Emergency worker refers to an individual who has an essential mission within or outside the plume exposure pathway emergency planning zone to protect the health and safety of

the public who could be exposed to ionizing radiation from the plume or from its deposition.

Some examples of emergency workers are: radiation monitoring personnel; traffic control personnel; evacuation vehicle drivers; fire and rescue personnel, including ambulance crews; medical facilities personnel; emergency operations center personnel; personnel carrying out backup alerting procedures; and essential services or utility personnel.

Facility refers to any building, center, room(s), or mobile unit(s) designed and equipped to support emergency operations.

Fixed contamination refers to contamination that remains after loose contamination has been removed by simple decontamination.

Geiger-Mueller detector refers to a type of radiation detector that can be used to measure the gamma, or beta plus gamma radiation depending on whether the detector is covered by a beta shield.

Health physics technician refers to an individual trained in radiation protection. For this objective, such individuals advise medical facility staff regarding the radiological monitoring and decontamination of individuals.

High levels of radiation exposure refers to doses of 100 rem or more.

Injured individual, as used in this objective, refers to an individual with external injuries (e.g., broken leg), acute internal conditions (e.g., heart attack), or some combination thereof.

Measuring refers to counting to detect radiation levels or determining other parameters, such as the energy of radiation or physical characteristics of samples, such as the volume of an air sample.

Monitoring refers to the measurement of radiation levels, usually with a portable survey instrument.

Recovery refers to the process of reducing radiation exposure rates and concentrations of radioactive material in the environment to acceptable levels for return by the general public for unconditional occupancy or use after the emergency phase of a radiological emergency.

Urgent medical condition, as used in this objective, refers to problems for which a delay in treatment may cause extended recovery time, reduced level of recovery, or death.